CROSSWAY PLACE BRIDGE
New Jersey Transit's Raritan Valley Line
at Milepost 19.42, over Crossway Place
Westfield
Union County
New Jersey

HAER No. NJ-111

HAER
NJ
20-WESFI,
3-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Philadelphia Support Office
U.S. Cuatom House
200 Cheatnut Street
Philadelphia, PA 19106

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Location:	New Jersey Transit's Raritan Valley Line at Milepost 19.42, over Crossway Place, Westfield, Union County, New Jersey UTM: 18.553690.4499500 Quadrangle: Roselle, NJ
Date of Construction:	1874, substructure 1915, 1968 superstructure
Engineer/Designer:	Office of the Chief Engineer, Central Railroad of New Jersey
Present Owner:	New Jersey Transit One Penn Plaza East, Newark, New Jersey 07105-2246
Present Use:	Open to Rail Traffic
Significance:	The 17'-long, 46'-wide, steel stringer bridge on ashlar sandstone abutments carries two active tracks and two abandoned tracks of the former Central Railroad of New Jersey's Main Line (now New Jersey Transit) over Crossway Place between Westfield and Fanwood, NJ. The bridge is significant as an example of an early-20th-century steel stringer railroad bridge located in the CNJ Main Line Historic District, a linear district recognizing the important role the CNJ played in New Jersey transportation, commerce, and suburbanization from 1831 to 1945. The line is noteworthy for the density of historic resources remaining along its right-of-way, including stations, bridges, and related structures and industries.
Project Information:	The Crossway Place Bridge documentation was undertaken in 1996 on behalf of New Jersey Transit in compliance with a Memorandum of Agreement as a mitigative measure prior to the removal of the bridge.

A. G. Lichtenstein & Associates
45 Eisenhower Drive
Paramus, NJ 07652
August, 1996

Setting

The Crossway Place bridge is located in western Westfield Township, Union County, New Jersey in a suburban setting. The bridge carries two active tracks and two abandoned tracks of New Jersey Transit's Raritan Valley Line (the former Central Railroad of New Jersey [CNJ] Main Line) over Crossway Place, a short street that connects North and South Avenues, two main east-west roads that parallel the railroad right-of-way (HAER Photograph NJ-111-5). The railroad is built on earth fill, measuring approximately 12'-high. Due to the surrounding modern development of late-20th-century commercial and residential buildings, the bridge does not have the context of its historical setting. Before 1945, the land adjacent to the bridge was farmland and scattered residences (Sanborn Map Co., 1886-1949). It is presently wooded with scattered modern structures.

Physical Description of Bridge

The Crossway Place Bridge is a 17'-long (clear span), approximately 46'-wide (out-to-out), steel stringer bridge supported on masonry abutments. The oldest parts of the structure are the abutments, which appear to date to 1874 when the CNJ elevated and quadruple tracked its main line from west of Westfield through Plainfield. CNJ records do not document the original superstructure of the Crossway Place bridge, although presumably the bridge was one of the "handsome iron girder bridges, supported by first-class stone abutments" described in the 1875 Annual Report (11). In 1915, the old superstructure was removed and replaced by steel stringers.

The Crossway Place bridge is notable as one of the few underpasses of the CNJ Main Line's Plainfield elevation that has not been lengthened, thus maintaining its original substructure treatment. The 17'-wide roadway between the abutments, while considered ample in the days of slower moving horse-drawn vehicles, is by modern standards narrow, accommodating only one lane of traffic at a time (HAER Photographs NJ-111-1, NJ-111-2). The coursed, rusticated, brown sandstone blocks have tooled margins or edges, a common period detail. In several places, stones have been replaced with brick or repaired with concrete (HAER Photographs NJ-111-3, NJ-111-4).

In 1915 the CNJ engineering department designed a new steel stringer superstructure. The center lines of the four tracks are spaced 13' apart. Centered under the rails of each track are two side-by-side I-shaped rolled beam stringers supporting an open deck of creosoted railroad ties. The ties and tracks have been removed from one of the two interior rail lines, providing a clear view of how the rails are centered above the I-beams (HAER Photograph NJ-111-4). According to original specifications, the stringers are 20'-long, 20"-deep, 140- lb. weight I-beams produced by the Bethlehem Steel Company. The paired I-beams are connected together by 3/4" bolts. Connecting the two sets of paired I-beams under each track are rivet-connected steel angle diaphragms. In 1968, the diaphragms of the two exterior tracks were replaced with weld-connected plates and angles. The beams have also been raised to increase vertical clearance over the roadway. The seats or bearings consist of variable thickness stacked steel plates (HAER Photograph NJ-111-4) .

History of the Crossway Place Bridge

The Crossway Place bridge is historically noteworthy in the context of the CNJ Main Line. Technologically, the 1915 steel stringer bridge supported by a late-19th-century substructure is a very common bridge type and design. The CNJ Main Line played a significant role in the development of transportation, commerce, and suburban patterns of settlement in northern New Jersey from 1831 to 1945, according to the New Jersey Historic Preservation Office's Determination of Eligibility documentation. The Main Line is noteworthy for the density of historic resources remaining along its right-of-way, including stations, bridges, and related structures. Crossway Place is one of more than 200 overhead or undergrade railroad bridges on the 63.6-mile-long route from Elizabethport, its eastern terminus, to Phillipsburg where the line crosses the Delaware River to Pennsylvania. The Main Line has been determined eligible as a linear historic district (National Register of Historic Places Determination of Eligibility, November 30, 1995).

The Crossway Place underpass, built in 1874 as part of the upgrading and four-tracking of the Main Line, was constructed by the CNJ to solve the common problem of how to safely and efficiently integrate the crossing of highway traffic with busy rail lines in congested areas (Stilgoe 1983: 163-188). The Crossway Place undergrade crossing was built as a direct result of the CNJ's decision to elevate and quadruple track the Main Line from Westfield through Plainfield to the east in 1874. The Plainfield elevation was the final part of the 17-mile-long Bound Brook to Jersey City section of the Main Line to be constructed for four tracks, a project that the CNJ had begun shortly after 1865. The four-track-wide Main Line was a formidable obstacle to highway traffic, and the CNJ ensured safety and few delays to its trains by providing regularly spaced overhead or undergrade bridges (CNJ Annual Report 1875: 11; Anderson 1984: 25).

The CNJ's four-track-wide Main Line was without doubt one of the most densely trafficked sections of railroad in the United States. The necessity of four tracks in a day-and-age when most main lines had but one or two tracks reflected the CNJ's strategic geographic position connecting New York Harbor and the Pennsylvania coal fields. In 1831, the CNJ began as the Elizabeth and Somerville Railroad Company (E&S) with the intention of linking Elizabethport at the southern end of New York Harbor with inland markets. Beset with financial difficulties, the E&S successfully merged with the Somerville & Easton Railroad in 1852, thus completing the Main Line from Elizabethport to Easton, PA where the line connected with the Lehigh Canal and Railroad. Although the CNJ took nearly 20 years to reach Pennsylvania, the CNJ Main Line was still the first railroad to offer continuous rail service across northern New Jersey. The CNJ soon reaped profits as one of the largest carriers of coal fuel to the homes and industries of New Jersey and New York City.

By the late 1860s, current and anticipated traffic on the Main Line justified quadruple tracking. In addition to serving eastbound coal trains, the eastern section of the line was already a busy commuter railroad serving the growing suburban communities along the CNJ corridor. In the 1870s and 1880s, the "BIG Little Railroad," as the CNJ was nicknamed, was one of the gateway railroads

to New York City, and thus had an important role to play in the integration of major interstate rail systems. In 1883, the CNJ leased its lines to the Philadelphia and Reading RR, itself allied with the B&O RR, making the CNJ part of a rail system stretching from New York City to the Midwest. Coal carried by the CNJ increased from 7.4 million tons in 1890 to 19.1 million tons in 1920, and from 13.7 million passengers in 1890 to 33.2 million passengers in 1920.

From the 1890s through the 1920s, the CNJ continually upgraded the Main Line. More frequent commuter trains, and longer, heavier freight trains tested the line's capacity. The engineering department applied many common solutions such as replacing track and adding sidings, building new terminals and yards, and upgrading locomotives and rolling stock. They also applied innovative technologies to improve efficiency and eliminate delays; in 1889-1890 the CNJ installed an early system of automatic block signaling; in 1910 laid the first heavy steel rails; and in 1925 acquired and operated the first diesel locomotive in the United States.

The 200-plus bridges on the CNJ Main Line, like all parts of the railroad infrastructure, were subjected to maintenance, repairs, and replacement as necessary. The Crossway Place bridge superstructure was replaced in 1915 as part of what the CNJ described as the routine "renewal" of older bridges (CNJ Report, 1916). As a matter of course, the CNJ replaced bridges that had outlived their useful life or no longer met heavier load requirements. The CNJ engineering department replaced bridges on a case-by-case basis, with economy of material for new bridges as the main criteria. Replacement bridges typically were steel stringers for short spans and built-up girders for longer spans because these were simple, low-cost, commonly used bridge types. There is no evidence from the CNJ's Reports and surviving bridges that the rail company's early-20th-century engineers thought that aesthetics was a significant consideration. The lack of aesthetic concerns was especially true for the smaller bridges up and down the line. On the CNJ Main Line only a handful of mid-19th-century stone arch bridges, mostly located on the line's western end, survived 20th-century replacement.(Crater 1963:10-16; New Jersey Transit 1991).

The leader in the development of rolled steel beams for stringer bridges was the Bethlehem Steel Company that supplied the beams for the Crossway Place Bridge. In the early 1900s, Bethlehem Steel invested in improved roll mill technology and was able to produce beams of greater strength, depth, and lighter weight, at reduced costs. Noted bridge engineer J. A. L. Waddell in his 1916 Bridge Engineering textbook stated that Bethlehem's I beams were "a great boon to bridge designers and builders" (Waddell, p. 47) due to their simplicity and economy. The CNJ engineering office, like the engineering departments of nearly all American railroads, was quick to take advantage of the strong, low-cost material. By 1914, the CNJ had standard specifications for I-beams and was accepting stock material from Bethlehem for use in short-span steel stringer bridges such as the Crossway Place structure.

The years after World War II were not kind to the CNJ. Competition from oil, electricity, and natural gas cut deeply into the CNJ's bread-and-butter coal business. Furthermore, passenger

service felt the inroads of the automobile. The commuter business required great amounts of rolling stock in use only during weekday rush hours; capitalization and maintenance of the commuter lines ate up much of CNJ's revenue. Even though the State of New Jersey began subsidizing commuter service in 1964, the CNJ entered bankruptcy in 1967. In 1976, the Main Line from Elizabethport to High Bridge was purchased by New Jersey Transit to operate as its Raritan Valley Line commuter service (Drury 1991: 58).

Sources of Information

The recordation of the Crossway Place Bridge was undertaken in the Summer of 1996 by A. G. Lichtenstein and Associates, Inc., subconsultants to STV Incorporated, under contract with New Jersey Transit. Recordation was completed by Mary McCahon, Project Manager/Historian; Patrick Harshbarger, Historian; and Thomas Flagg, Photographer.

Field work included visual inspection of the bridge as well as reference to published and unpublished archival materials and resources. Engineering plans were consulted from the offices of New Jersey Transit, Newark, NJ. Other sources of information included materials in the collection of the Hagley Museum and Library, Wilmington, DE; the New Jersey State Library, Trenton, NJ; and the New Jersey Historic Preservation Office, Trenton, NJ.

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CROSSWAY PLACE BRIDGE SKETCH MAP (N.T.S.)